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## Coriolis Testing Earth, Space Weather Instruments

**MICHAEL A. DORNHEIM/LOS ANGELES**

The Air Force/Navy Coriolis test satellite was placed into orbit from Vandenberg AFB, Calif., on Jan. 6 after five scrubbed launches due to weather and technical problems.

The satellite was working properly as of the middle of last week. It carries two experimental instruments--the WindSat microwave polarimetric radiometer built by the Naval Research Laboratory (NRL), and the Solar Mass Ejection Imager (SMEI) provided by the Air Force Research Laboratory at Hanscom AFB, Mass. Coriolis is part of USAF's Space Test Program, and the bus was built by Spectrum Astro.

WindSat is designed to indirectly measure wind speed and direction at the ocean surface by observing wind-induced surface roughness, which affects brightness in different frequencies. WindSat is the first space-based radiometer able to completely measure polarization (cross-products as well as vertical and horizontal components) of the ocean's microwave radiation.

"Timely measurement of wind direction from space is a Navy requirement that hasn't been met," said Peter W. Gaiser, the NRL WindSat principal investigator. The complete polarization measurement should make that possible.

The SMEI has three charge-coupled-device cameras that take pictures of the

*WILLIAM G. HARTENSTEIN*

**Pre-dawn liftoff of Titan II took Coriolis into polar orbit. Upper half of spacecraft (at right) spins at 31 rpm. to scan WindSat instrument, while cameras on despun bus search for disruptive solar flares. Cold sky reflector is**

entire sky to look for coronal mass ejections (CMEs) from the Sun. The cameras have to be able to determine light intensity within 0.1% to detect the CMEs from the celestial background. The purpose is to detect Earth-bound CMEs that could disrupt satellites, communications and power grids. The SMEI should also detect near-Earth objects.

**for WindSat calibration.**

The WindSat instrument cost about \$70 million; SMEI, about \$10 million. The total cost of the Coriolis program, including launch, modifications to ground stations and one year of operation, is \$223.5 million.

Coriolis was launched by a Lockheed Martin Titan II converted ICBM at 6:19 a.m. PST into a 531 X 175-mi. orbit inclined at 98.7 deg. The orbit should be circularized to 525 mi. around Jan. 17 by Space Test Program ground control at Kirtland AFB, N.M. While Coriolis was on the pad, engineers discovered a sign error in the magnetic torquer attitude control system. The problem could have been fixed with an inflight software patch, but they decided to change the software through an umbilical cable (*AW&ST* Dec. 23, 2002, p. 20).



The next-generation National Polar-orbiting Operational Environmental Satellite System will use WindSat information to reduce risk for its Conical Microwave Imager Sounder.

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